



OSCILLATEK

A **DOVER** TECHNOLOGIES COMPANY

CRYSTAL OSCILLATORS

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STC Components
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CRYSTALS & OSCILLATORS

TTL OSCILLATORS

Quantity Pricing (Per Unit Price, FOB Santa Ana)

<u>Frequency</u>	<u>25</u>	<u>50</u>	<u>100</u>	<u>250</u>	<u>500</u>	<u>1000</u>
1.8432 MHz	2.50	2.25	2.00	1.85	1.80	1.77
4.0, 8.0, 9.6, 10.0, 12.0, 14.31818, 16.0, 16.257, 20.0 MHz	2.25	2.00	1.90	1.80	1.70	1.65
24.0, 25.0, 25.175, 28.332, 28.63636, 30.0, 32.0, 40.0, 48.0 MHz	2.25	2.00	1.95	1.85	1.75	1.70
50 MHz	3.00	2.50	2.25	2.10	2.05	1.96

All Frequencies In Stock

2277 South Grand Ave.
Santa Ana, CA 92705
Tel: (714) 556-1228
Fax: (714) 556-2350

STC Components

Harmony Crystals

Frequency/Package	Quantity Pricing (Per Unit Price, FOB Santa Ana)						
	<u>50</u>	<u>100</u>	<u>250</u>	<u>500</u>	<u>1000</u>	<u>2500</u>	<u>5000</u>
32.768 KHz/DT-38	.50	.40	.35	.30	.25	.22	.20
1.8432 MHz/HC-49/U	2.25	2.00	1.80	1.50	1.35	1.27	1.25
2.0000 MHz/HC-49/U	1.80	1.60	1.40	1.20	1.10	1.07	1.05
2.4576 MHz/HC-49/U	1.40	1.20	1.00	.90	.80	.78	.76
3.579545, 4.0, 4.9152, 5.12, 6.0, 6.144, 8.0, 9.6, 10.24, 12.0, 12.288, 14.31818, 16.0, 18.432 MHz/HC-49/U	.75	.50	.44	.42	.41	.39	.38
19.6608, 20.0 MHz/HC-49/U	1.25	1.00	.80	.70	.65	.63	.61
24.0, 25.0 MHz/HC-49/U	1.50	1.25	1.05	.95	.82	.80	.79
30.0 MHz 3rd OT							
40.0 MHz 3rd OT/HC-49/U	.80	.65	.55	.52	.50	.49	.48

Other Products

DC-DC Converters
 Delay Lines
 EMI/RFI Filters
 Digital & Analog Panel Meters

Switched Mode Power Supplies
 Pulse Transformers
 Power Transformers
 Wall Mount Adapters

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Commercial, Military, TTL, CMOS, HCMOS, ECL

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OSCILLATEK CRYSTAL OSCILLATORS

OCXO'S TCVCXO'S TCXO'S CLOCK OSCILLATORS

Since 1979, Oscillatek has been a steadily growing supplier of precision crystal oscillators. Oscillatek has always been guided by three principles:

1. Excellence in Customer Service
2. Engineering Leadership
3. Quality Products

We will always be guided by these three principles. Thus, despite enormous growth, numerous exciting new products, and greatly expanded facilities, we will always be a company with a very simple message. Whatever your oscillator requirement, come to Oscillatek for its fulfillment. You will find a friendly, courteous company ready to give priority to your needs. Your oscillators will be designed and manufactured by intelligent experts in this very specialized technology, with careful attention to quality from the very first contact until the final oscillator is shipped. You will find it very easy to talk to us, even when discussing the most difficult requirements. After all, that's our business.

OUR PRODUCTS

OCXO'S

Ovenized crystal oscillators offer very good stability versus temperature, especially in applications where space and power are not at a premium. Our expertise here is in thermal and mechanical design.

TCVCXO'S

Voltage-tuned TCXO's for low-distortion linear and phase-locked loop applications are another Oscillatek strength.

TCXO'S

Our temperature compensated crystal oscillators are used in applications where reliability, size, weight and power requirements are difficult to meet with ovenized oscillators. Our computer-aided compensation network synthesis technique allows us to use a minimum number of components most effectively to reduce compensation error to the minimum possible.

CLOCK OSCILLATORS

Our crystal-controlled thick film hybrid clock oscillators offer high reliability in small packages. We offer many standard packages including DIP, TO-5, TO-8, Flatpack and LCC. One of our specialties is very high frequency clock oscillators. All hybrid oscillators are manufactured in our new, controlled-environment clean room.

OSCILLATEK

A DOVER TECHNOLOGIES COMPANY

620 N. Lindenwood Drive • Olathe, Kansas 66062 • Phone: (913) 829-1777 • TELEX: 437045 • FAX: (913) 829-3505

QUALITY ASSURANCE

Corporate policy dictates that quality is of primary concern in the manufacture of every Oscillatek oscillator, be it Hybrid, TCXO, commercial, or military. Oscillatek's quality program as defined in the Quality Assurance Manual meets the requirements of MIL-I-45208, and is structured to ensure that delivered products conform to specifications. Implementation of the program is the responsibility of the Quality Assurance Department, where quality and workmanship are monitored closely from incoming inspection through final pre-shipping inspection.

The test department is equipped with a master frequency standard continuously calibrated to the National Bureau of Standards from which signals are distributed to every test station, and an automatic test facility with software capable of automatically measuring and recording the output frequencies of oscillators at programmable time intervals and temperatures. Additional test capabilities include sinusoidal vibration, phase noise, acceleration, and seal testing. All equipment is calibrated to a program which meets MIL-STD-45662.

Workmanship standards are designed along the guidelines of MIL-STD-883, MIL-STD-454, and MIL-0-55310. Oscillatek has several products qualified to MIL-0-55310 and has had its facility surveyed and approved by numerous military and aerospace contractors. Government source inspection is available through DCAS on an itinerant basis.

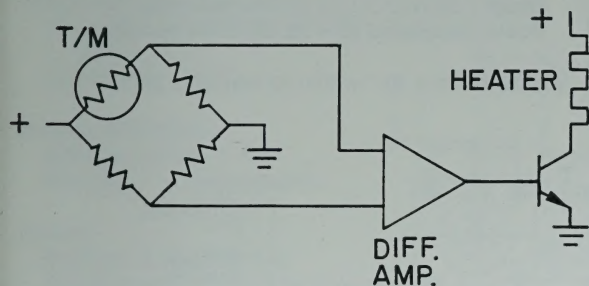
Hybrid devices using custom hybrid microcircuit construction are assembled in a Class 100,000 cleanroom facility for both commercial and military applications. Operation of this facility is in accordance with FED-STD-209 and MIL-0-55310.

We at Oscillatek realize that quality is achieved only through a commitment to excellence. This commitment can be seen on a daily basis throughout our manufacturing facility.

CRYSTAL OSCILLATORS OCXO

High Stability Ovenized Oscillators

A high stability ovenized oscillator is the most stable of all crystal oscillators. The crystal and its associated circuitry are held to a specific temperature within a very tight tolerance through the use of a proportional oven and control circuit. Very sensitive and fast response thermistors (thermal detectors) are employed in strategic locations to detect any thermal change in the oscillator oven and command immediate corrective action. A typical simplified circuit appears below.



The ability of an ovenized oscillator to remain at a constant temperature lends itself to the use of 3rd, 5th and 7th overtone crystals with turn points in excess of 100° C. For that reason, ovenized oscillators provide very high frequency stability and very low aging rates.

The ovenized oscillator comes in many sizes with varying degrees of stabilities over wide temperature ranges. The ability of an ovenized oscillator to remain stable is dependent on the ability of the oven to maintain a constant temperature at the turn temperature of the crystal. The stability of an ovenized oscillator over wide temperature variations is directly related to size and power. If size is constrained, then more power must be available to maintain the same temperature versus frequency stability. If physical size is not a factor, additional thermal insulation may be employed and power reduced.

At Oscillatek, our engineers can design an OCXO to meet the exact needs of your application, at minimal cost, if you provide us with exact requirements and acceptable tolerances for the following parameters. (Additional oscillator specifying information can be found on page 23.)

Important OCXO Parameters

1. Nominal output frequency.
2. Setability
3. Aging
4. Output
5. Load
6. Short term stability
7. Phase noise
8. Electrical tuning
9. Warm-up time
10. Input supply voltage
11. Input supply current
12. Operating temperature range
13. Storage temperature range
14. Frequency stability versus temperature
15. Frequency stability versus load change
16. Frequency stability versus input voltage change
17. Package size
18. MIL-Specifications

OVEN CONTROLLED CRYSTAL OSCILLATORS

OCXO P/N 5333 & 8001

**P/N
5333**

OUTPUT:

Frequency: 2.019600 MHz

Waveform: Square

HCMOS Compatible

"1" Level: $4.5 \pm 0.5V$

"0" Level: 0 to 0.5V

Rise/Fall Times: 20n Sec maximum

Duty Cycle: $50\% \pm 10\%$

Load: 500Ω to +4.5V, 100pf to Gnd

STABILITY:

Temperature: $\pm 1 \times 10^{-8}$, $0^\circ C$ to $+70^\circ C$

Supplies: 1×10^{-9} /percent (each supply)

AGING: 1×10^{-8} /Day
 5×10^{-7} /Year

FREQUENCY ADJUSTMENT: Mechanical

Range: $\pm 5 \times 10^{-6}$ minimum

Setability: 1×10^{-8}

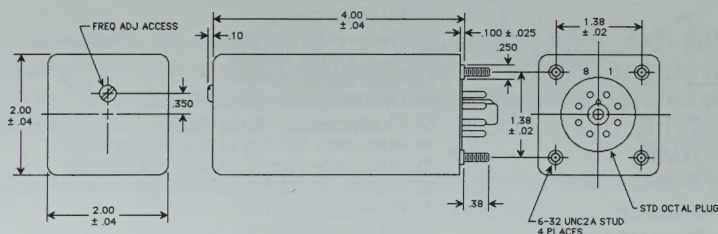
SUPPLIES:

Oscillator: $+11.5VDC \pm 0.5VDC$, 40mA max.

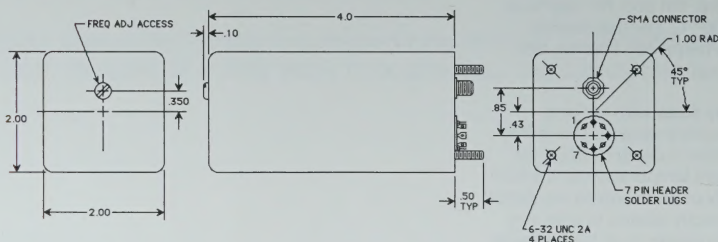
Oven: $+26VDC \pm 2.6VDC$, 500mA max.

Power (stabilized @ $+25^\circ C$): 3 Watts, max.

WARM-UP: 2×10^{-7} within 10 min. @ $+25^\circ C$



PIN	FUNCTION
1	+11.5V DC
2	GND (11.5V + SIGNAL)
3	OUTPUT
4	NC
5	CASE GND
6	+26V DC (OVEN)
7	OVEN (26V) GND
8	NC



PIN	FUNCTION
1	N/C
2	CASE
3	GND
4	SUPPLY
5	VCCO SUPPLY *
6	VCCO INPUT *
7	VCCO RETURN *

* WHEN SPECIFIED
OTHERWISE, NO CONNECTION

**P/N
8001**

OUTPUT on SMA connector:

Frequency: 100.00 MHz

Waveform: Sinewave

Level: +7dBm minimum

Load: 50Ω

Harmonics: -20dBc

Subharmonics: -20dBc

STABILITY:

Temperature: $\pm 3 \times 10^{-8}$, $0^\circ C$ to $+50^\circ C$

Supply: $\pm 1 (10^{-8})$, $15VDC \pm 5\%$

AGING: 1×10^{-8} /Day
 5×10^{-7} /Year

FREQUENCY ADJUSTMENT:

Mechanical: $\pm 3 \times 10^{-6}$ minimum

Electrical: 3×10^{-7} minimum

SUPPLY:

Voltage: $+15VDC \pm 5\%$

Power: 6 watts maximum @ turn on
stabilized @ $+25^\circ C$: 2 watts maximum

WARM-UP: 2×10^{-7} within 10 min. @ $+25^\circ C$

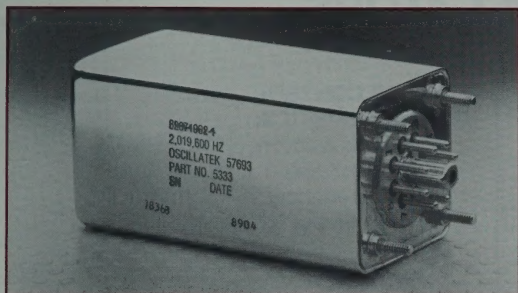
PHASE NOISE:

100Hz	-95dBc
1KHz	-120dBc
10KHz	-140dBc
100KHz	-145dBc

OSCILLATEK

OVEN CONTROLLED CRYSTAL OSCILLATORS

MODEL 800 SERIES OCXO



In the 800 Series of Oven Controlled Crystal Oscillators, Oscillatek offers a wide range of performance and mechanical options. The following options are offered as suggestions of possible starting points for your unique requirements for precision Ovenized Quartz Crystal Oscillators.

Output Options (Standard):
TTL, CMOS, HCMOS, or SINE:
+7dBm, 50 Ω
Harmonics: -20dBc

Supply (Standard):
Voltage: 24VDC \pm 5%
Stability: 1×10^{-9} /percent

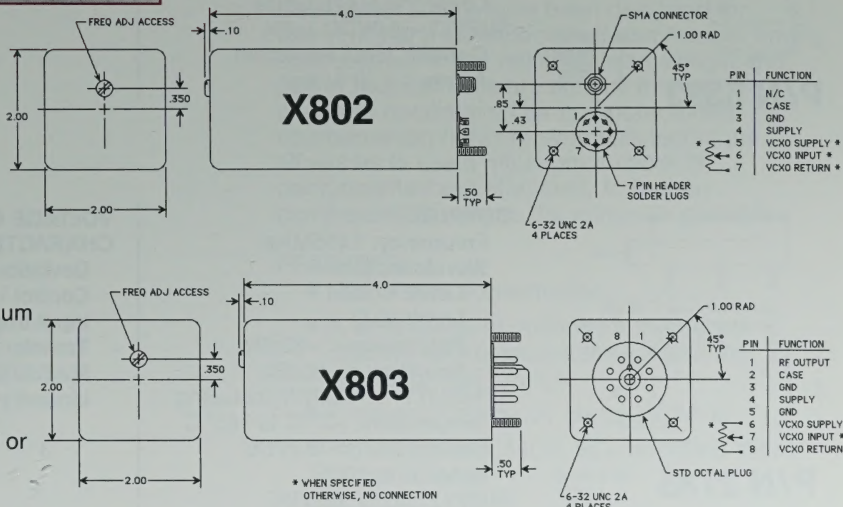
Power:
Turn-on: 8 W maximum
Stabilized @ +25°C: 3 W maximum

Frequency Adjust:
Mechanical: For 10 years aging
Electrical (with option "E"):
 3×10^{-7} minimum for 0 to +5V or
external 20K potentiometer

Phase Noise (Sine, 10MHz):

Offset	SSB Level
100 Hz	-130dBc/Hz
1 KHz	-140dBc/Hz
10 KHz	-145dBc/Hz
50 KHz	-150dBc/Hz

Supply Options:
Any specified voltage in the range of 12VDC to 28VDC.
Multiple supplies for oven, RF and Logic.
Output Options (Additional):
Sine Output: Levels from -20dBm to +13dBm
ECL: Available with addition of -5.2V supply



ORDERING METHOD

OUTPUT LOGIC	MODEL NUMBER	AGING PER DAY	TEMP. RANGE	FREQUENCY STABILITY OPTION		VOLTAGE CONTROL	FREQUENCY	SUPPLY VOLTAGE
T = TTL	X802	1 = 1×10^{-8}	A = 0°C to +50°C	39 = $\pm 3 \times 10^{-9}$	28 = $\pm 2 \times 10^{-8}$ 18 = $\pm 1 \times 10^{-8}$	E IF VOLTAGE CONTROL OPTION IS DESIRED	TTL = .01Hz to 30MHz	SPECIFIED SUPPLY VOLTAGE: 12VDC TO 28VDC
S = SINE	X803	2 = 5×10^{-9}	B = 0°C to +70°C	59 = $\pm 5 \times 10^{-9}$	58 = $\pm 5 \times 10^{-8}$ 18 = $\pm 1 \times 10^{-8}$		SINE = 100KHz to 30MHz	
C = CMOS		3 = 3×10^{-9}	C = -20°C to +70°C	18 = $\pm 1 \times 10^{-8}$	58 = $\pm 5 \times 10^{-8}$ 28 = $\pm 2 \times 10^{-8}$		CMOS = .01Hz to 15MHz	
HC = HCMOS		4 = 1×10^{-9}	D = -40°C to +70°C	28 = $\pm 2 \times 10^{-8}$	17 = $\pm 1 \times 10^{-7}$ 58 = $\pm 5 \times 10^{-8}$		HCMOS = .01Hz to 30MHz	
			E = -55°C to +70°C	58 = $\pm 5 \times 10^{-8}$	27 = $\pm 2 \times 10^{-7}$ 17 = $\pm 1 \times 10^{-7}$			

EXAMPLE

S	X802	2	B	18	—	10 MHz	,	24V
---	------	---	---	----	---	--------	---	-----

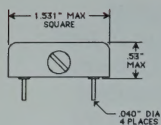
NOTE: SX8022B18-10MHz,24V is a catalog number which defines an ovenized crystal oscillator in the X802 package with a 10MHz Sine output, aging of 5×10^{-9} /day, stability of $\pm 1 \times 10^{-8}$ over the temperature range of 0°C to +70°C, operating on a +24VDC supply.

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TEMPERATURE COMPENSATED VOLTAGE CONTROLLED CRYSTAL OSCILLATORS



P/N 5393

OUTPUT:

Frequency: 4.00MHz
Waveform: Square
HCMOS/TTL Compatible
Duty Cycle: 50% \pm 10%

STABILITY: \pm 2.5PPM including

Temperature: 0°C to +50°C

Supply: 5.0VDC \pm 5%

Load: 3 to 5 TTL Gates

SUPPLY: +5.0VDC \pm 5%

Current: 15mA maximum

Aging: 1 x 10⁻⁶/Year

VOLTAGE CONTROL CHARACTERISTICS:

Deviation: \pm 150Hz (\pm 37.5PPM)

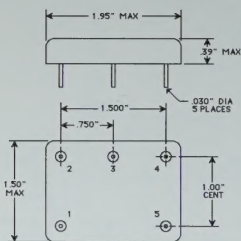
Control Voltage: 0 \pm 5V

Input Impedance: 20K Ω minimum

Transfer Slope: Negative

Modulation Rate: DC to 3KHz

Linearity: \pm 10%



P/N 2785

OUTPUT:

Frequency: 1.455MHz

Waveform: Sine

Level: +7dBm

Load: 50 Ω

Harmonics: < -20dBc

Spurious: < -60dBc

STABILITY: \pm 400PPM including

Temperature: -32°C to +85°C

Supply: 9.6V to 10.2VDC

Load: 50 to 1005L

SUPPLY: 9.6 to 10.2VDC

Current: 35mA maximum

VOLTAGE CONTROL CHARACTERISTICS:

Deviation: \pm .08% minimum

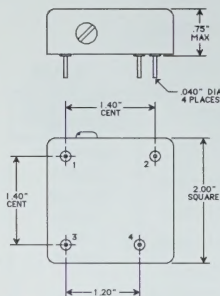
Control Voltage: 0 \pm 5V

Input Impedance: 50K Ω minimum

Transfer Slope: Negative

Modulation Rate: DC to 10KHz

Linearity: \pm 10%



P/N 5325

OUTPUT:

Frequency: 138.6MHz

Waveform: Sine

Level: +7dBm minimum

Load: 50 Ω

Harmonics: < -20dBc

Subharmonics: < -20dBc

Spurious: < -60dBc

STABILITY:

Temperature: \pm 1 x 10⁻⁶,
0°C to +70°C

Supply: \pm 15 x 10⁻⁷/percent

SUPPLY: +15 \pm 2VDC

Current: 20mA maximum

Aging: 2 x 10⁻⁶/Year

VOLTAGE CONTROL CHARACTERISTIC:

Deviation: \pm 700Hz minimum

Control Voltage: 0 to +5V

Input Impedance: 10K Ω minimum

Transfer Slope: Negative

Modulation Rate: DC to 1KHz

Linearity: \pm 20%

TEMPERATURE COMPENSATED CRYSTAL OSCILLATORS

TCXO'S
VCXO'S
TCVCXO'S

Oscillatek TCXO's have been designed for use in military, aerospace and commercial timing applications, where reliability, size, weight and power requirements are difficult to meet with ovenized oscillators. Our computer aided compensation network synthesis technique allows us to use a minimum number of components most effectively to reduce compensation error to the minimum possible.

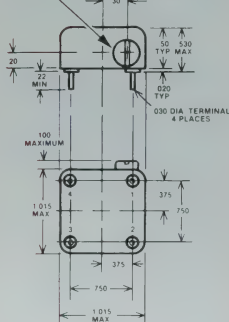
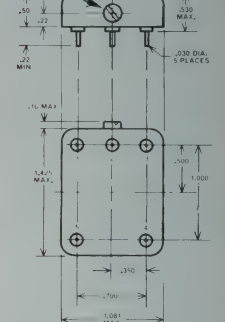
FEATURES:

- Low power consumption.
- A wide range of options for frequency stability versus temperature within the -55°C to +125° range.
- Frequency range .01 Hz to 200 MHz.
- HCMOS, TTL, CMOS, ECL and Sine Wave output options.
- Fast warm-up.
- Cost effective.

NOTE: Our model number is to be used for reference only when specifying a specific oscillator requirement. A wide variety of options and variations, which are difficult to code into a model number, are available.

TEMPERATURE COMPENSATED CRYSTAL OSCILLATORS WITH USER DEFINED OPTIONS

TCXO MODELS X101 & X114

X101	OPTIONS	X114																									
<div><div><p>“O” ring seal freq. adj.</p></div><div><p>“O” ring seal freq. adj.</p></div></div>																											
<h3>STANDARD SPECIFICATIONS</h3>																											
<h4>ELECTRICAL</h4>																											
<ul style="list-style-type: none">● Supply Voltage: Standard: +12V DC $\pm 5\%$, ECL: -5.2V DC $\pm 5\%$ Optional: Specify from +5V DC to 28V DC range● Supply Current: TTL: 15mA Typical @ 20 MHz CMOS: 10 mA Typical @ 10 MHz, as low as 1.5mA ECL: Less than 80 mA SINE: 20mA Typical @ 20 MHz, as low as 2.0mA Supply Current is frequency dependent, consult factory.● Output:																											
<table><tr><th>LOGIC</th><th>“I” LEVEL</th><th>“O” LEVEL</th><th>SYMMETRY</th><th>LOAD</th></tr><tr><td>TTL</td><td>2.4V Min.</td><td>0.5VMax.</td><td>40/60</td><td>10 TTL (< 20MHZ) 6 TTL (> 20MHZ)</td></tr><tr><td>CMOS</td><td>V_{cc} -1.0V Min.</td><td>1.0V Max.</td><td>40/60</td><td>10 pf Nominal 50 pf Maximum</td></tr><tr><td>ECL</td><td colspan="2">10K Logic Family</td><td>40/60</td><td>Standard ECL</td></tr><tr><td>SINE</td><td colspan="4">100 KHZ to 10 MHZ: 1 VRMS, 1K OHMS Above 10 MHZ: 0.5 VRMS, 50 OHMS Harmonics: -20dBc Min.</td></tr></table>			LOGIC	“I” LEVEL	“O” LEVEL	SYMMETRY	LOAD	TTL	2.4V Min.	0.5VMax.	40/60	10 TTL (< 20MHZ) 6 TTL (> 20MHZ)	CMOS	V _{cc} -1.0V Min.	1.0V Max.	40/60	10 pf Nominal 50 pf Maximum	ECL	10K Logic Family		40/60	Standard ECL	SINE	100 KHZ to 10 MHZ: 1 VRMS, 1K OHMS Above 10 MHZ: 0.5 VRMS, 50 OHMS Harmonics: -20dBc Min.			
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<ul style="list-style-type: none">● Short Term Aging: 1×10^{-9}/sec. (Controlled environment)● Voltage Stability: $\pm 2 \times 10^{-8}$/percentage change● Mechanical Frequency Adj.: To compensate for a minimum of 5 years aging.																											
<h4>ENVIRONMENTAL</h4>																											
<ul style="list-style-type: none">● Shock: 50g; 11msec. per MIL-STD-202, method 213, cond. G● Vibration: 5g to 500 Hz per MIL-E-5400 Fig. 2, curve III● Storage Temperature: -55°C to 85°C● Altitude: Sea level to space● Humidity: MIL-STD-202, method 103, cond. B																											
<p>NOTE: These are typical values, for critical requirements consult factory.</p>																											

CONNECTION		
PIN	CMOS, TTL, SINE	ECL
1	GND, CASE	V _{ee} **
2*	GND	N.C.
3	SUPPLY	V _{cc} **
4	OUTPUT	OUTPUT

*When optional voltage control or external potentiometer is specified, Pin 2 will be designated for this use.

**On ECL units, the specified supply ground pin will also be case ground—normally Pin 3 (with V_{ee} specified as -5.2V DC)

WEIGHT = < 2 oz.
MOUNTING = P.C.B. Type
SEAL = Solder

CONNECTION		
PIN	CMOS, TTL, SINE	ECL
1*	NC	NC
2*	NC	NC
3	SUPPLY	V _{cc} **
4	OUTPUT	OUTPUT
5	CASE, GROUND	V _{ee} **

*When optional voltage control or external potentiometer is specified, Pins 1 and 2 will be designated for this use.

**On ECL units, the specified supply ground pin will also be case ground—normally Pin 3 (with V_{ee} specified as -5.2V DC)

WEIGHT = < 2 oz.
MOUNTING = P.C.B. Type
SEAL = Solder

ORDERING METHOD

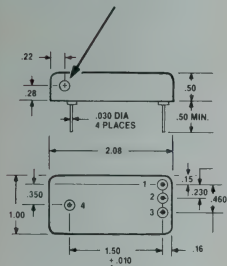
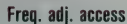
OUTPUT LOGIC	MODEL NUMBER	TEMP. RANGE	FREQUENCY STABILITY OPTION	FREQUENCY RANGE
T = TTL	X101	A = 0°C to 50°C	17 = $\pm 1 \times 10^{-7}$, 27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$	TTL = .01 Hz to 125 MHz
C = CMOS	X114	B = 0°C to 70°C	27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$	CMOS = .01 Hz to 15 MHz
E = ECL		C = -20°C to 70°C	27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$	ECL = 1 MHz to 200 MHz
S = SINE		D = -40°C to 85°C	57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$	SINE = 100 KHz to 200 MHz
HC = HCMOS		E = -55°C to 85°C	16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$	HCMOS = .01Hz to 125 MHz
		F = -55°C to 105°C	26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$	
		G = -55°C to 125°C	56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$, 25 = $\pm 2 \times 10^{-5}$	

EXAMPLE

T X114 B 27 — 10 MHz

NOTE: TX114B27-10MHZ is a model number selected with TTL output in X114 package and with $\pm 2 \times 10^{-7}$ stability over 0°C to 70°C.

MODELS X121 & X151 TCXO



PIN	CONNECTION	
	CMOS, TTL, SINE	ECL
1	OUTPUT	OUTPUT
2	SUPPLY	V _{CC}
3	GND	V _{EE}
4	GND	CASE

WEIGHT = < 2 oz.
MOUNTING = P.C.B. Type
SEAL = Solder

OPTIONS

- OUTPUT LOGIC ● FREQUENCY ● STABILITY
● TEMPERATURE RANGE ● SUPPLY VOLTAGE

STANDARD SPECIFICATIONS

ELECTRICAL

- **Supply Voltage:** Standard: +12V DC $\pm 5\%$ ECL: -5.2V DC $\pm 5\%$
Optional: Specify from +5V DC to 28V DC range.
- **Supply Current:** TTL: 15mA Typical @ 20 MHz
CMOS: 10 mA Typical @ 10 MHz, as low as 1.5mA
ECL: Less than 80 mA
SINE: 20mA Typical @ 20 MHz, as low as 2.0mA
Supply Current is frequency dependent, consult factory.

- **Output:**

LOGIC	"1" LEVEL	"0" LEVEL	SYMMETRY	LOAD
TTL	2.4V Min.	0.5VMax.	40/60	10 TTL (< 20MHZ) 6 TTL (> 20MHZ)
CMOS	V _{cc} -1.0V Min.	1.0V Max.	40/60	10 pf Nominal 50 pf Maximum
ECL	10K Logic Family		40/60	Standard ECL
SINE	100 KHZ to 10 MHZ: 1 VRMS, 1K OHMS Above 10 MHZ: 0.5 VRMS, 50 OHMS Harmonics: -20dBc Min.			

- **Short Term Aging:** 1×10^{-9} /sec. (Controlled environment)
- **Voltage Stability:** $\pm 2 \times 10^{-8}$ /percentage change
- **Mechanical Frequency Adj.:** To compensate for a minimum of 5 years aging.

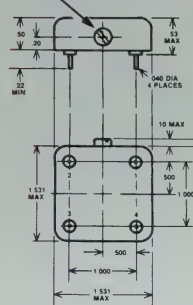
ENVIRONMENTAL

- **Shock:** 50g; 11msec. per MIL-STD-202, method 213, cond. G
- **Vibration:** 5g to 500 Hz per MIL-E-5400 Fig. 2, curve III
- **Storage Temperature:** -55°C to 85°C ● **Altitude:** Sea level to space
- **Humidity:** MIL-STD-202 method 103, cond. B

NOTE: These are typical values, for critical requirements consult factory.

X151

"O" ring seal freq. adj.



PIN	CONNECTION	
	CMOS, TTL, SINE	ECL
1	GND, CASE	V _{ee} **
2	SUPPLY	V _{cc} **
3	OUTPUT	OUTPUT
4*	GND	NC

*When optional voltage control or external potentiometer is specified, Pin 4 will be designated for this use.

**On ECL units, the specified supply ground Pin will also be case ground—normally Pin 2 (with V_{ee} specified as -5.2V DC)

WEIGHT = < 2 oz.
MOUNTING = P.C.B. Type
SEAL = Solder

ORDERING METHOD

OUTPUT LOGIC	MODEL NUMBER	TEMP. RANGE	FREQUENCY STABILITY OPTION	—	FREQUENCY RANGE
T = TTL	X12I	A = 0°C to 50°C	17 = $\pm 1 \times 10^{-7}$, 27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$	—	TTL = .01 Hz to 125 MHz
C = CMOS	X15I	B = 0°C to 70°C	27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$		CMOS = .01 Hz to 15 MHz
E = ECL		C = -20°C to 70°C	27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$		ECL = 1 MHz to 200 MHz
S = SINE		D = -40°C to 85°C	57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$		SINE = 100 KHz to 200 MHz
HC = HCMOS		E = -55°C to 85°C	16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$		HCMOS = .01 Hz to 125 MHz
		F = -55°C to 105°C	26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$		
		G = -55°C to 125°C	56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$, 25 = $\pm 2 \times 10^{-5}$		

EXAMPLE

T	X121	B	27	—	10 MHz
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NOTE: TX121B27-10MHZ is a model number selected with TTL output in X121 package and with $\pm 2 \times 10^{-7}$ stability over 0°C to 70°C.

TEMPERATURE COMPENSATED CRYSTAL OSCILLATORS

TCXO MODELS X154 & X201

X154

"O" ring seal freq. adj.

CONNECTION			
PIN	CMOS, TTL, SINE	ECL	
1	GND	V _{ee}	
2	CASE	CASE	
3	SUPPLY	V _{cc}	
4	OUTPUT	OUTPUT	

WEIGHT = < 2 oz.
MOUNTING = P.C.B. Type
SEAL = Solder

OPTIONS

• OUTPUT LOGIC • FREQUENCY • STABILITY
• TEMPERATURE RANGE • SUPPLY VOLTAGE

STANDARD SPECIFICATIONS

ELECTRICAL

- **Supply Voltage:** Standard: +12V DC \pm 5%; ECL: -5.2V DC
Optional: Specify from +5V DC to 28V DC range
- **Supply Current:** TTL: 15 mA Typical @ 20 MHz
CMOS: 10mA Typical @ 10 MHz, as low as 1.5mA
ECL: Less than 80mA
SINE: 20mA Typical @ 20 MHz, as low as 2.0mA
Supply current is frequency dependent, consult factory.
- **Output:**

LOGIC	"1" LEVEL	"0" LEVEL	SYMMETRY	LOAD
TTL	2.4V Min.	0.5VMax.	40/60	10 TTL (< 20MHZ) 6 TTL (> 20MHZ)
CMOS	V _{cc} -1.0V Min.	1.0V Max.	40/60	10 pf Nominal 50 pf Maximum
ECL	10K Logic Family		40/60	Standard ECL
SINE	100 KHZ to 10 MHZ: 1 VRMS, 1K OHMS Above 10 MHZ: 0.5 VRMS, 50 OHMS Harmonics: -20dBc Min.			

- **Short Term Aging:** 1 x 10⁻⁹/sec. (Controlled environment)
- **Voltage Stability:** \pm 2 x 10⁻⁸/percentage change
- **Mechanical Frequency Adj.:** To compensate for a minimum of 5 years aging.

ENVIRONMENTAL

- **Shock:** 50g; 11msec. per MIL-STD-202, method 213, cond. G
- **Vibration:** 5g to 500 Hz per MIL-E-5400 Fig. 2, curve III
- **Storage Temperature:** -55°C to 85°C • **Altitude:** Sea level to space
- **Humidity:** MIL-STD-202, method 103, cond. B

NOTE: These are typical values, for critical requirements consult factory.

X201

"O" ring seal freq. adj.

CONNECTION			
PIN	CMOS, TTL, SINE	ECL	
1	SUPPLY	V _{cc} *	
2	GND, CASE	V _{ee} *	
3	NC	NC	
4	OUTPUT	OUTPUT	

* On ECL units, the specified supply ground Pin will also be case ground—normally Pin 1 (with V_{ee} specified as -5.2V DC)

WEIGHT = < 2 oz.
MOUNTING = P.C.B. Type
SEAL = Solder

ORDERING METHOD

OUTPUT LOGIC	MODEL NUMBER	TEMP. RANGE	FREQUENCY STABILITY OPTION	FREQUENCY RANGE
T = TTL C = CMOS E = ECL S = SINE HC = HCMOS	X154 X201	A = 0°C to 50°C B = 0°C to 70°C C = -20°C to 70°C D = -40°C to 85°C E = -55°C to 85°C F = -55°C to 105°C G = -55°C to 125°C	17 = $\pm 1 \times 10^{-7}$, 27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$ 27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$ 27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$ 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$ 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$ 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$ 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$, 25 = $\pm 2 \times 10^{-5}$	TTL = .01 Hz to 125 MHz CMOS = .01 Hz to 15 MHz ECL = 1 MHz to 200 MHz SINE = 100 KHz to 200 MHz HCMOS = .01 Hz to 125 MHz

EXAMPLE

T	X201	B	27	—	10 MHz
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NOTE: TX201B27-10MHZ is a model number selected with TTL output in X201 package and with $\pm 2 \times 10^{-7}$ stability over 0°C to 70°C.

TEMPERATURE COMPENSATED CRYSTAL OSCILLATORS

MODELS X202 & X205 **TCXO**

X202

OPTIONS

• OUTPUT LOGIC • FREQUENCY • STABILITY
• TEMPERATURE RANGE • SUPPLY VOLTAGE

X205

STANDARD SPECIFICATIONS

ELECTRICAL

- **Supply Voltage:** Standard: +12V DC \pm 5%; ECL: -5.2V DC
Optional: Specify from +5V DC to 28V DC range
- **Supply Current:** TTL: 15 mA Typical @ 20 MHz
CMOS: 10mA Typical @ 10 MHz, as low as 1.5mA
ECL: Less than 80mA
SINE: 20mA Typical @ 20 MHz, as low as 2.0mA
Supply current is frequency dependent, consult factory.
- **Output:**

LOGIC	"I" LEVEL	"O" LEVEL	SYMMETRY	LOAD
TTL	2.4V Min.	0.5V Max.	40/60	10 TTL (< 20MHz) 6 TTL (< 20MHz)
CMOS	V_{cc} -1.0V Min.	1.0V Max.	40/60	10 pF Nominal 50 pF Maximum
ECL	10K Logic Family		40/60	Standard ECL
SINE	100 KHz to 10 MHz: 1 VRMS, 1K OHMS Above 10 MHz: 0.5 VRMS, 50 OHMS Harmonics: -20dBc Min.			

- **Short Term Aging:** 1×10^{-9} /sec. (Controlled environment)
- **Voltage Stability:** $\pm 2 \times 10^{-8}$ /percentage change
- **Mechanical Frequency Adj.:** To compensate for a minimum of 5 years aging.

ENVIRONMENTAL

- **Shock:** 50g; 11msec. per MIL-STD-202, method 213, cond. G
- **Vibration:** 5g to 500 Hz per MIL-E-5400 Fig. 2, curve III
- **Storage Temperature:** -55°C to 85°C • **Altitude:** Sea level to space
- **Humidity:** MIL-STD-202, method 103, cond. B

NOTE: These are typical values, for critical requirements consult factory.

"O" ring seal freq. adj.

ORDERING METHOD

OUTPUT LOGIC	MODEL NUMBER	TEMP. RANGE	FREQUENCY STABILITY OPTION	FREQUENCY RANGE
T = TTL	X202	A = 0°C to 50°C	17 = $\pm 1 \times 10^{-7}$, 27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$	TTL = .01 Hz to 125 MHz
C = CMOS	X205	B = 0°C to 70°C	27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$	CMOS = .01 Hz to 15 MHz
E = ECL		C = -20°C to 70°C	27 = $\pm 2 \times 10^{-7}$, 57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$	ECL = 1 MHz to 200 MHz
S = SINE		D = -40°C to 85°C	57 = $\pm 5 \times 10^{-7}$, 16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$	SINE = 100 KHz to 200 MHz
HC = HCMOS		E = -55°C to 85°C	16 = $\pm 1 \times 10^{-6}$, 26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$	HCMOS = .01 Hz to 125 MHz
		F = -55°C to 105°C	26 = $\pm 2 \times 10^{-6}$, 56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$	
		G = -55°C to 125°C	56 = $\pm 5 \times 10^{-6}$, 15 = $\pm 1 \times 10^{-5}$, 25 = $\pm 2 \times 10^{-5}$	

EXAMPLE

T	X205	B	27	—	10 MHz
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NOTE: TX205B27-10MHZ is a model number selected with TTL output in X205 package and with $\pm 2 \times 10^{-7}$ stability over 0°C to 70°C.

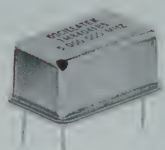
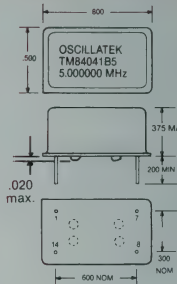
OSCILLATEK

A DOVER TECHNOLOGIES COMPANY

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TEMPERATURE COMPENSATED CRYSTAL OSCILLATORS WITH USER DEFINED OPTIONS

TCXO MODEL DIP MINIATURE

ACTUAL SIZE	OPTIONS	• OUTPUT LOGIC • FREQUENCY • STABILITY • TEMPERATURE RANGE • SUPPLY VOLTAGE		M84
	STANDARD SPECIFICATIONS			
	<ul style="list-style-type: none">• Voltage stability: $V_{cc} \pm 5\%$, $\Delta F < 1\text{PPM}$ $V_{cc} \pm 10\%$, $\Delta F < 2\text{PPM}$• Duty cycle: 40-60% (TTL, CMOS, ECL)• Aging: 5PPM first year; 2PPM per year thereafter• Frequency Adjust: Control voltage in range of 9 to 5V (variable capacitor optional)• Storage Temperature: -55°C to 85°C <p>NOTE: These are typical values, for critical requirements consult factory</p>			
TTL	ECL	SINEWAVE	CMOS	
<ul style="list-style-type: none">• Load: 10TTL up to 20 MHz 6TTL above 20 MHz• Output: Square wave "0" = .5V max. "1" = 2.4V min.• Input Current: Typical values are as follows: 4 to 32 MHz < 40 mA	<ul style="list-style-type: none">• Supply Voltage: $-5.2\text{V} \pm 5\%$• Input Current: 70mA max.• Output: ECL Compatible (10KH Series)	<ul style="list-style-type: none">• Supply Voltage: $5\text{V} \pm 5\%$• Input Current: Typical values are as follows: 25 mA (Max) 5mA to 10 mA Typical at 5.00 MHz• Output: .3V RMS min. into 1K Ohms	<ul style="list-style-type: none">• Input Voltage: 4.5V to 15V (Specify)• Output Levels: 10% max. to 90% min. of Vdd, CL = 15PF.	

ORDERING METHOD

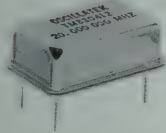
OUTPUT LOGIC	PACKAGE DIP	PIN OPTION	PIN CONNECTIONS			TEMPERATURE RANGE/ STABILITY		—	FREQUENCY (RANGE)																											
T = TTL C = CMOS E = ECL S = SINE	M84 = .8"x.5"x.375" No insulation stand offs M846 = .8"x.5"x.375" with glass stand offs 4 places NOTE: Lower height available for limited range of frequencies	04 = 4 Pins Pin dia = .018" ± .001	1 =	<table><tr><th>PIN</th><th colspan="2">CONNECTION</th></tr><tr><td></td><td>TTL, CMOS, SINE</td><td>ECL</td></tr><tr><td>7</td><td>GND/CASE GND</td><td>-5.2V</td></tr><tr><td>8</td><td>OUT</td><td>OUT</td></tr><tr><td>14</td><td>Vcc</td><td>GND</td></tr><tr><td>1</td><td colspan="2">FREQ. ADJ/MOD (OPT.)</td></tr></table>	PIN	CONNECTION			TTL, CMOS, SINE	ECL	7	GND/CASE GND	-5.2V	8	OUT	OUT	14	Vcc	GND	1	FREQ. ADJ/MOD (OPT.)		<table><tr><td>A2</td><td>0° - + 50°C, ± 2PPM</td></tr><tr><td>A5</td><td>0° - + 50°C, ± 5PPM</td></tr><tr><td>B5</td><td>0° - + 70°C, ± 5PPM</td></tr><tr><td>C10</td><td>-30° - + 70°C, ± 10PPM</td></tr><tr><td>D15</td><td>-30° - + 85°C, ± 15PPM</td></tr></table>	A2	0° - + 50°C, ± 2PPM	A5	0° - + 50°C, ± 5PPM	B5	0° - + 70°C, ± 5PPM	C10	-30° - + 70°C, ± 10PPM	D15	-30° - + 85°C, ± 15PPM	NOTE: consult factory for special requirements.	—	TTL = 1KHz to 32MHz *CMOS = 1KHz to 10MHz ECL = 4MHz to 32MHz SINE = 4MHz to 32 MHz Note: Contact factory for very low current and HC-MOS requirements.
PIN	CONNECTION																																			
	TTL, CMOS, SINE	ECL																																		
7	GND/CASE GND	-5.2V																																		
8	OUT	OUT																																		
14	Vcc	GND																																		
1	FREQ. ADJ/MOD (OPT.)																																			
A2	0° - + 50°C, ± 2PPM																																			
A5	0° - + 50°C, ± 5PPM																																			
B5	0° - + 70°C, ± 5PPM																																			
C10	-30° - + 70°C, ± 10PPM																																			
D15	-30° - + 85°C, ± 15PPM																																			

EXAMPLE

T	M84	04	1	B5	—	5.000 000 MHZ	Consult factory for any special testing or screening required
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NOTE: TM84041B5-5.000 000 MHZ is a model number in above example selected with TTL compatible output in 4-Pin DIP package with glass stand offs, and 5PPM stability over 0° to 70°C .

VOLTAGE CONTROLLED CRYSTAL OSCILLATORS



OPTIONS

- OUTPUT LOGIC • FREQUENCY • STABILITY
- TEMPERATURE RANGE • SUPPLY VOLTAGE

SPECIFICATIONS

OUTPUT: High Speed C-MOS / TTL Compatible

OPERATING TEMP. RANGE: -45°C to +85°C
As Specified, See Options

STORAGE TEMP. RANGE: -55°C to 125°C

SUPPLY VOLTAGE: 5.0 VDC, $\pm 5\%$

SUPPLY CURRENT: 45 mA MAX. @ 30 MHz
35 mA MAX. @ 20 MHz
25 mA MAX. @ 10 MHz

DUTY CYCLE: 60 / 40%, 50% Level

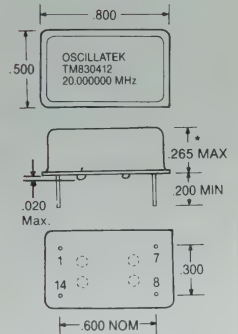
Tr, Tf: 15.0 nS MAX., 10% to 90% Levels

Voh: Vcc-0.2 V MIN.

Vol: 0.2 V, MAX.

Control Voltage: 0.5 VDC to 4.5 VDC

TRANSFER SLOPE: Positive



ORDERING METHOD

OUTPUT LOGIC	PACKAGE TYPE	PIN OPTION	PIN CONNECTIONS	TEMP. RANGE	STABILITY	DEVIATION*	—	FREQUENCY RANGE								
T = TTL HC = HC-MOS	M83 = .8"x.5" Standard DIP (without Glass Stand Offs) M836 = .8"x.5" Standard DIP (with Glass Stand Offs)	04 = 4 Pins	1 =	A = 0° to 50°C	25 = ± .0025 %	A = ± 50 ppM	—	250 KHz to 32 MHz								
			<table><tr><td>1</td><td>VCONT.</td></tr><tr><td>7</td><td>GND/CASE</td></tr><tr><td>8</td><td>OUT</td></tr><tr><td>14</td><td>Vcc</td></tr></table>	1	VCONT.	7			GND/CASE	8	OUT	14	Vcc	B = 0° to 70°C	50 = ± .005%	B = ± 100 ppM
			1	VCONT.												
			7	GND/CASE												
			8	OUT												
14	Vcc															
C = -20° to 70°C	100 = ± .01%	C = ± 150 ppM														
D = -45° to 85°C	* Deviation over full 0.5 to 4.5 V control voltage range. Deviation per volt = ± deviation / 2 V															
S = Consult Factory for special Pin Outs																

EXAMPLE	HC	M83G	04	1	B	50	B	—	10.000 MHZ	Write "Screened" if screening to MIL-0-55310/16, Class B, Table II is required.
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NOTE: HCM83G041 B50B-10.000 MHz is a model number in above example selected with HC-MOS compatible output in 4-Pin DIP package with glass stand offs, standard Pin Outs, $\pm .005\%$ stability over 0°C to 70°C temperature range, and a deviation of ± 100 ppM over a control voltage of 0.5 to 4.5 VDC.

QPL'D CLOCK OSCILLATORS

M55310/09/14/16/17

- **MIL-O-55310/9** (TO5 Equivalent Package)
 - **OUTPUT:** TTL Square wave.
 - **FREQUENCY RANGE:** 400 KHz to 30 MHz
 - **SCREENING CLASS:** B

NOTE: For QPL part number selection see the latest slash sheet issued by DESC on M55310/9.

- **MIL-O-55310/14** (DIP Package)
 - **OUTPUT:** TTL Square wave.
 - **FREQUENCY RANGE:** .1 Hz to 25 MHz
 - **SCREENING CLASS:** B

NOTE: For QPL part number selection see the latest slash sheet issued by DESC on M55310/14.

- **MIL-O-55310/16** (DIP Package)
 - **OUTPUT:** TTL Square wave.
 - **FREQUENCY RANGE:** 0.1 Hz to 60 MHz
 - **SCREENING CLASS:** B

NOTE: For QPL part number selection see the latest slash sheet issued by DESC on M55310/16.

- **MIL-O-55310/17** (DIP Package)
 - **OUTPUT:** TTL Square wave.
 - **FREQUENCY RANGE:** 250 KHz to 32 MHz
 - **SCREENING CLASS :** B

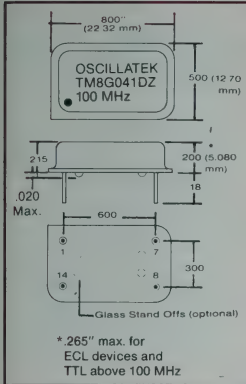
NOTE: For QPL part number selection see the latest slash sheet issued by DESC on M55310/17.

NOTE: Consult Factory for current qualification status on different MIL-O-55310 slash sheets.

DIP

CRYSTAL CLOCK OSCILLATORS

WITH USER DEFINED OPTIONS



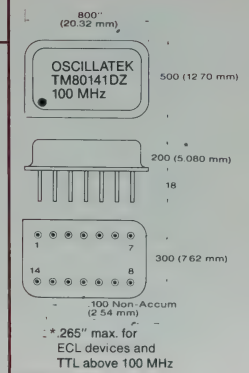
OPTIONS

- OUTPUT LOGIC • FREQUENCY • STABILITY
- TEMPERATURE RANGE • SUPPLY VOLTAGE

SPECIFICATIONS

- **Absolute stability:** Range .005% thru .1% (Specify) Inclusive of calibration tolerance at 25°C, operating temperature range, input voltage change, load change, aging, shock and vibration.
- **Output options:** Dual Phase, multiple frequency, enable/disable, consult factory.
- **Duty cycle:** 40-60%
- **Storage:** -55°C to 125°C
- **Environmental:** Per MIL-0-55310/16

NOTE: These are typical values, for critical requirements consult factory



TTL

- **Supply Voltage:** 5V DC $\pm 10\%$
- **Load:** 10TTL up to 20 MHz
6TTL above 20 MHz
- **Output:** Square wave
"0" = .5V max.
"1" = 2.4V min.
- **Input Current:**
1 Hz to 3.2 MHz < 70mA
3.2 MHz to 25 MHz < 30mA
25 MHz to 120 MHz < 70mA

ECL

- **Input Current:** 75mA max.
- **Output:** ECL Compatible
(from 10KH Series)
or
(from 100K Series)

HCMOS

- **Supply Voltage:** 5V $\pm 10\%$
- **Load:** 50 pF
- **V_{OH}:** V_{CC} -0.2V min.
- **V_{OL}:** 0.2V max.
- **Input Current:** 20 MHz < 30mA
50 MHz < 60mA

CMOS 4000 Series

- **Input Voltage:** 4.5V to 15V
Supply Voltage must be specified
 - **Output Levels:** "0" 0.1 (V_{DD}) max.
"1" 0.9 (V_{DD}) min.
 - **Input Current:** 5V, 3.4mA Typ
15V, 19mA Typ
- Note:** For frequencies above 10MHz we suggest HCMOS

ORDERING METHOD

OUTPUT LOGIC	PACKAGE DIP	PIN OPTION	PIN CONNECTIONS	** STABILITY	TEMP. RANGE	—	FREQUENCY (RANGE)																	
T = TTL	M80 = .8"x.5"x.2" Standard DIP (without Glass Stand Offs)	14 = 14 Pins	<div>1 =<table><tr><th rowspan="2">PIN</th><th colspan="2">CONNECTION</th></tr><tr><th>TTL, CMOS, HCMOS</th><th>ECL</th></tr><tr><td>7</td><td>GND</td><td>V_{ee}</td></tr><tr><td>8</td><td>OUT</td><td>OUT</td></tr><tr><td>14</td><td>V_{cc}</td><td>GND</td></tr><tr><td>REST</td><td>NC/ITP</td><td></td></tr></table></div>	PIN	CONNECTION		TTL, CMOS, HCMOS	ECL	7	GND	V _{ee}	8	OUT	OUT	14	V _{cc}	GND	REST	NC/ITP		*A = ± .001%	R = 0°C to 50°C	—	TTL = 1Hz to 120MHz
PIN	CONNECTION																							
	TTL, CMOS, HCMOS	ECL																						
7	GND	V _{ee}																						
8	OUT	OUT																						
14	V _{cc}	GND																						
REST	NC/ITP																							
C = CMOS	M86 = .8"x.5"x.2" Standard DIP (with Glass Stand Offs at 4 places)	04 = 4 Pins	*B = ± .0025%	S = 0°C to 70°C	CMOS = 700Hz to 12MHz																			
E = ECL (10KH)		Pin dia = .018" ± .001	C = ± .005%	X = -20°C to 70°C	ECL = 3.2MHz to 120MHz																			
HC = HCMOS			D = ± .01%	Y = -40°C to 85°C																				
EK = ECL (100K)			E = ± .05%	Z1 = -55°C to 105°C																				
			F = ± .1%	Z = -55°C to 125°C																				
S = Consult Factory for special Pin Outs				* A and B does not include calibration tolerance or aging. Frequency accuracy at 25°C is ± .0015% ** ± .0015% Accuracy at +25°C available on all stability options. Must be specified when ordering.		HCMOS = 60Hz to 120MHz																		

EXAMPLE

T	M8G	04	1	D	Z	—	100 MHZ	Write "SCREENED" if screening to MIL-0-55310/16, Class B, Table II is required.
---	-----	----	---	---	---	---	---------	---

NOTE: TM8G041DZ-100 MHZ is a model number in above example selected with TTL compatible output in 4-Pin DIP package with glass stand offs, standard Pin Outs & $\pm .01\%$ stability over -55°C to 125°C.

OSCILLATEK

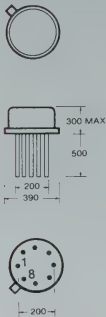
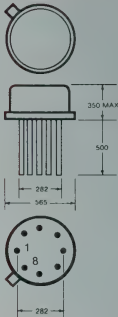
A DOVER TECHNOLOGIES COMPANY

620 N. Lindenwood Drive • Olathe, Kansas 66062 • Phone: (913) 829-1777 • TELEX: 437045 • FAX: (913) 829-3505

TO5, TO8

CRYSTAL CLOCK OSCILLATORS

WITH USER DEFINED OPTIONS

TO5	OPTIONS	TO8
	<p>• OUTPUT LOGIC • FREQUENCY • STABILITY • TEMPERATURE RANGE • SUPPLY VOLTAGE</p> <h3>SPECIFICATIONS</h3> <ul style="list-style-type: none"> • Absolute Stability: Range .005% thru .1% (Specify) Inclusive of calibration tolerance at 25°C, operating temperature range, input voltage change, load change, aging, shock and vibration. • Output Options: Dual Phase, multiple frequency, enable/disable, consult factory. • Duty cycle: 40-60% • Storage: -55°C to 125°C • Environmental: Per MIL-O-55310/09 <p>NOTE: These are typical values, for critical requirements consult factory</p>	
<h3>TTL</h3> <ul style="list-style-type: none"> • Supply Voltage: 5V DC \pm 10% • Load: 10TTL up to 20 MHz 6TTL above 20 MHz • Output: Square wave "0" = .5V max. "1" = 2.4V min. • Input Current: .1 Hz to 3.2 MHz < 40mA 3.2 MHz to 25 MHz < 30mA 25 MHz to 75 MHz < 70mA 	<h3>HC-MOS</h3> <ul style="list-style-type: none"> • Input Voltage: 5V \pm 10% • Output: Square wave "0" = 0.2V max. "1" = Vdd - 0.2V min • Input Current: 10MHz 20mA max. 20MHz 30mA max. 50MHz 60mA max. 	<h3>CMOS</h3> <ul style="list-style-type: none"> • Input Voltage: 4.5V to 15V Supply Voltage must be specified • Output Level: "0" 0.1 (Vdd) max. • Input Current: 5V, 3.4mA Typ 15V, 19mA Typ <p>Note: For frequencies above 10MHz we suggest HCMOS</p>

ORDERING METHOD

OUTPUT LOGIC	PACKAGE SELECTION	NO. OF PINS	PIN CONNECTIONS	** STABILITY	TEMP. RANGE	—	FREQUENCY (RANGE)										
T = TTL C = CMOS HC = HCMOS	05 = T05 08 = T08	8 = 8 Pins	1 = <table><tr><th>PIN</th><th>CONNECTION</th></tr><tr><td>4</td><td>GND</td></tr><tr><td>5</td><td>OUT</td></tr><tr><td>8</td><td>V_{CC}</td></tr><tr><td>REST</td><td>NC/ITP</td></tr></table> S = Special Pin Out (Consult Factory)	PIN	CONNECTION	4	GND	5	OUT	8	V _{CC}	REST	NC/ITP	*A = ± .001% *B = ± .0025% C = ± .005% D = ± .01% E = ± .05% F = ± .1% * A and B does not include calibration tolerance or aging. Frequency accuracy at 25°C is ± .0015%. ** ± .0015% Accuracy at +25°C available on all stability options. Must be specified when ordering.	R = 0°C to 50°C S = 0°C to 70°C X = -20°C to 70°C Y = -40°C to 85°C Z1 = -55°C to 105°C Z = -55°C to 125°C	—	TTL = 1Hz to 60MHz CMOS = 5MHz to 12MHz HC-MOS = 60Hz to 50MHz
PIN	CONNECTION																
4	GND																
5	OUT																
8	V _{CC}																
REST	NC/ITP																

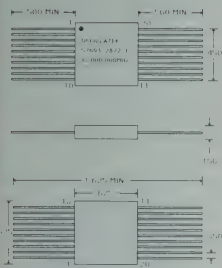
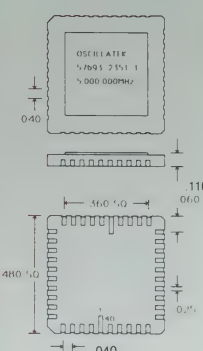
EXAMPLE

C	05	8	1	D	Z1	—	10 MHZ	Write "SCREENED" if screening to MIL-O-55310/16, Class B, Table II is required.
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NOTE: C0581DZ1-10 MHZ is a model number in above example selected with CMOS compatible output in TO5 package with 8 pins, standard Pin Outs, \pm .01% stability over -55°C to 105°C.

FLATPACK LCC PACKAGES CRYSTAL CLOCK OSCILLATORS

WITH USER DEFINED OPTIONS

625	OPTIONS	480
<p>• OUTPUT LOGIC • FREQUENCY • STABILITY • TEMPERATURE RANGE • SUPPLY VOLTAGE</p>		
<p>SPECIFICATIONS</p> <p>OUTPUT: High Speed C-MOS, TTL COMPATIBLE</p> <p>STORAGE TEMP. RANGE: -65°C to 150°C</p> <p>SUPPLY VOLTAGE: 5V DC \pm 10%</p> <p>SUPPLY CURRENT: 60 mA MAX. @ 50 MHz 45 mA MAX. @ 30 MHz 30 mA MAX. @ 20 MHz 20 mA MAX. @ 10 MHz</p> <p>DUTY CYCLE: 60 / 40%, 50% Level</p> <p>Tr, Tf: 5.0 nS MAX., 10% to 90% Levels</p> <p>Voh: Vcc-0.2 V MIN.</p> <p>Vol: 0.2 V, MAX.</p> <p>Due to Our use of a proprietary HC-MOS Gate Array in these devices, We are able to offer the widest selection in the industry of output options. These options include:</p> <ul style="list-style-type: none"> Dual Phase outputs Enable/Disable of outputs Tristate outputs Up to 3 separate output frequencies (F, F/2^N, F/2^{N+1}) Programmable output frequencies Combinations of the above <p>Please contact the factory for additional information if these options interest you.</p>		
		

ORDERING METHOD

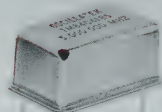
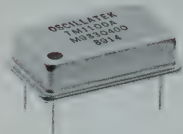
OUTPUT LOGIC	PACKAGE TYPE	PIN CONNECTIONS	** STABILITY	TEMP. RANGE	— FREQUENCY RANGE																				
T = TTL HC = HCMOS	480 = .480" x .480" x .110" Leadless chip carrier package with 40 pins 625 = .625" x .625" x .15" Flat Package with 20 Pins	1 = LCC-PACKAGE 480 <table><tr><th>PIN</th><th>CONN.</th></tr><tr><td>4, 10</td><td>V_{CC}</td></tr><tr><td>31, 37</td><td>GND</td></tr><tr><td>39</td><td>OUT</td></tr><tr><td>REST</td><td>NC/ITP</td></tr></table> 1 = FLAT-PACKAGE 625 <table><tr><th>PIN</th><th>CONN.</th></tr><tr><td>10</td><td>GND</td></tr><tr><td>11</td><td>OUT</td></tr><tr><td>20</td><td>V_{CC}</td></tr><tr><td>REST</td><td>NC/ITP</td></tr></table>	PIN	CONN.	4, 10	V _{CC}	31, 37	GND	39	OUT	REST	NC/ITP	PIN	CONN.	10	GND	11	OUT	20	V _{CC}	REST	NC/ITP	*A = ± .001% *B = ± .0025% C = ± .005% D = ± .01% E = ± .05% F = ± .1%	R = 0°C to 50°C S = 0°C to 70°C X = -20°C to 70°C Y = -40°C to 85°C Z1 = -55°C to 105°C Z = -55°C to 125°C	TTL = 60Hz to 60MHz HC-MOS = 60Hz to 60MHz
PIN	CONN.																								
4, 10	V _{CC}																								
31, 37	GND																								
39	OUT																								
REST	NC/ITP																								
PIN	CONN.																								
10	GND																								
11	OUT																								
20	V _{CC}																								
REST	NC/ITP																								
Please contact the factory if you have other output requirements.		* A and B does not include calibration tolerance or aging. Frequency accuracy at 25°C is ± .0015% ** ± .0015% Accuracy at +25°C available on all stability options. Must be specified when ordering.																							

EXAMPLE

HC	480	1	D	Z	—	40MHz	Write "Screened" if screening to MIL-0-55310/16, Class B, Table II is required
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NOTE: HC4801DZ-40.000000MHz is a model number in above example selected with HC-MOS compatible output in a 40 Lead, LCC package with glass stand offs, standard Pin Out, \pm .01% stability over -55°C to +125°C.

CRYSTAL CLOCK OSCILLATORS



OPTIONS

- OUTPUT LOGIC • FREQUENCY • STABILITY
- TEMPERATURE RANGE • SUPPLY VOLTAGE

SPECIFICATIONS

OUTPUT: TTL COMPATIBLE

OPERATING TEMP. RANGE: 0°C to +70°C

STORAGE TEMP. RANGE: -55°C to 125°C

SUPPLY VOLTAGE: 5.0 VDC, $\pm 10\%$

SUPPLY CURRENT: 60 mA MAX. @ 50 MHz
45 mA MAX. @ 30 MHz
30 mA MAX. @ 20 MHz
20 mA MAX. @ 10 MHz

DUTY CYCLE: 60/40%, at the 1.4V level

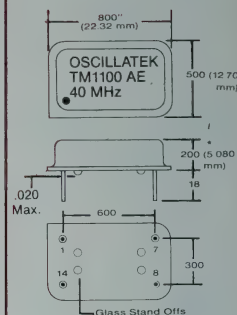
Tr, Tf: 60 Hz to 4 MHz, 20 ns MAX.
4.01 MHz to 20 MHz, 10 ns MAX.
Above 20.0 MHz, 5 ns MAX.

V_{OH}: 2.4 V MIN.

V_{OL}: 0.5 V, MAX.

PIN CONNECTIONS

1	SEE OPTION CHART
7	GND / CASE
8	OUTPUT
14	V _{CC}



*265" max. for frequencies above 100 MHz

ORDERING METHOD

STANDARD SERIES—TTL	ABSOLUTE STABILITY	OUTPUT OPTION					—	FREQUENCY
		OPT. #	DESCRIPTION	PIN 1 FUNC.	PIN 1	PIN 8		
TM1100	$\pm .01\%$	A	STANDARD	N.C.	N.C.		—	60 Hz to 120 MHz
TM1114	$\pm .05\%$	AD**	DUAL PHASE	OUTPUT				
TM1115	$\pm .1\%$	AE**	ENABLE	INPUT				
TM1144	$\pm .0025\%$	AF**	DUAL FREQ. ***	OUTPUT				
TM1145	$\pm .005\%$	AZ**	TRI-STATE	INPUT				

EXAMPLE

TM1100

AE

—

40 MHz



Write "Screened" if screening to MIL-0-55310/16, Class B, Table II is required

NOTE: TM1100AE-40.000000 MHz is a model number in above example selected with TTL compatible output in 4-pin DIP package with glass stand offs, standard Pin Out, $\pm .01\%$ stability over 0°C to 70°C, and output disable capability.

**Not available above 50MHz

*** Pin 1 freq. is binarily derived from the pin 8 freq.

CRYSTAL CLOCK OSCILLATORS

OPTIONS • OUTPUT LOGIC • FREQUENCY • STABILITY
 • TEMPERATURE RANGE • SUPPLY VOLTAGE

SPECIFICATIONS

OUTPUT: HIGH SPEED C-MOS

OPERATING TEMP. RANGE: 0°C to +70°C

STORAGE TEMP. RANGE: -55°C to 125°C

SUPPLY VOLTAGE: 5.0 VDC, ± 10%

SUPPLY CURRENT: 60 mA MAX. @ 50 MHz
 45 mA MAX. @ 30 MHz
 30 mA MAX. @ 20 MHz
 20 mA MAX. @ 10 MHz

DUTY CYCLE: 60/40%, at the 50% level

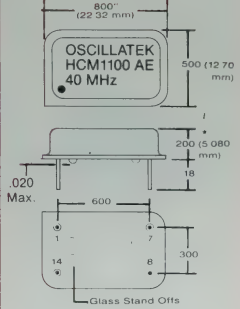
Tr, Tf: 5.0nS MAX, 10% to 90% Levels

Voh: Vcc-0.2V MIN

Vol: 0.2 V, MAX.










PIN CONNECTIONS

1	SEE OPTION CHART
7	GND / CASE
8	OUTPUT
14	Vcc



*.265" max. for frequencies above 100 MHz

ORDERING METHOD

STANDARD SERIES—HCMOS	ABSOLUTE STABILITY	OUTPUT OPTION					—	FREQUENCY
		OPT. #	DESCRIPTION	PIN 1 FUNC.	PIN 1	PIN 8		
HCM1100	± .01%						—	60 Hz to 50 MHz
HCM1114	± .05%	A	STANDARD	N.C.	N.C.			
HCM1115	± .1%	AD**	DUAL PHASE	OUTPUT				
HCM1144	± .0025%	AE**	ENABLE	INPUT				
HCM1145	± .005%	AF**	DUAL FREQ. ***	OUTPUT				
		AZ**	TRI-STATE	INPUT				

EXAMPLE

HCM1100	AE	—	40 MHz	Write "Screened" if screening to MIL-0-55310/16, Class B, Table II is required
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NOTE: HCM1100AE-40.000000 MHz is a model number in above example selected with HC-MOS compatible output in 4-pin DIP package with glass stand offs, standard Pin Out, ± .01% stability over 0°C to 70°C, and output disable capability.

** Not available above 50 MHz

*** Pin 1 freq. is binarily derived from the pin 8 freq.

EM1100 SERIES — 4 PIN DIP PACKAGE — 10 MHz - 350 MHz

CRYSTAL CLOCK OSCILLATORS



OPTIONS

- OUTPUT LOGIC • FREQUENCY • STABILITY
- TEMPERATURE RANGE • SUPPLY VOLTAGE

SPECIFICATIONS

OUTPUT: 10K Series Compatible to 120 MHz
10KH Series Compatible above 120 MHz

OPERATING TEMP. RANGE: 0°C to +70°C

STORAGE TEMP. RANGE: -55°C to 125°C

SUPPLY VOLTAGE: -5.2 VDC, $\pm 5\%$

SUPPLY CURRENT: 40 mA TYP., 60 mA MAX.

DUTY CYCLE: 60 / 40%, 50% Level

Tr, Tf: 2.0 nS MAX., 20% to 80% Levels

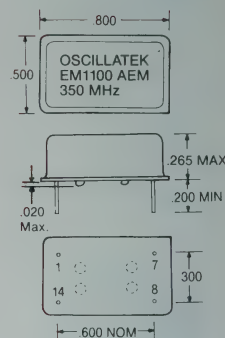
Voh: -0.98 V MIN., -0.74 V MAX.

Vol: -1.63 V MAX., -1.95 V MIN.











PIN CONNECTIONS

1	SEE OPTION CHART
7	V _{EE}
8	OUTPUT
14	V _{CC} / CASE

NOTE: With the exception of the "AR" Output Option, these devices will not develop an Output Signal without an External Emitter Resistor connected from the Output to V_{EE}.



ORDERING METHOD

STANDARD SERIES—ECL	ABSOLUTE STABILITY	OUTPUT OPTION						—	FREQUENCY
EM1100	± .01%	OPT. #	DESCRIPTION	PIN 1 FUNC.	PIN 1	PIN 8	FREQ. RANGE AVAILABLE	—	10 MHz to 350 MHz "AF" Option, Specify Pin #8 frequency
EM1114	± .05%	A	Standard	NONE	N.C.		10 MHz - 350 MHz		
EM1115	± .1%	AD	Dual Phase	OUTPUT			10 MHz - 120 MHz		
EM1144	± .0025%	AE	Enable	INPUT			10 MHz - 120 MHz		
EM1145	± .005%	AEM	Enable	INPUT			10 MHz - 350 MHz		
		AF	F, F/2 OUT	F/2 OUT			20 MHz - 350 MHz		
		AR*	INTERNAL RE	NONE	N.C.		10 MHz - 350 MHz		
* Internal Emitter Resistor (620 Ω)									

EXAMPLE

EM1100

AEM

— 350 MHz

Write "Screened" if screening to MIL-0-55310/16, Class B, Table II is required.

NOTE: EM1100AEM-350MHz is a model number in above example selected with ECL compatible output in 4-pin DIP package with glass stand offs, standard Pin Outs, $\pm .01\%$ stability over 0°C to 70°C, and output disable capability.

OSCILLATEK

A **DOVER** TECHNOLOGIES COMPANY

10/06/92

Mr. Phil Accardi
United Technologies Photonics
1289 Blue Hills Avenue
Bloomfield, CT 06002

Dear Mr. Accardi:

Thank you for your recent inquiry about Oscillatek oscillators.
Please find enclosed a catalog listing our product line.

Oscillatek's representative in your area is
Addelco Corporation
20 Freeman Place
Needham, MA 02192
Phone: 617-444-4754

If you have a requirement or if you would like to receive a
quotation, please contact our representative or our sales
department. We are eager to earn your business.

Our sales department consists of Bill Beck, Marketing Manager;
Angela Baumgarten, Marketing Administrator; and Tricia Ebeling,
Sales Administrator. We will promptly provide answers to any
pricing, delivery, or technical questions you may have.

Thank you for your interest in our company. We look forward
to your call.

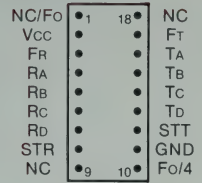
Best regards,

Tricia Ebeling

Tricia Ebeling
Sales Administrator

Enclosure

DUAL BAUD RATE GENERATORS

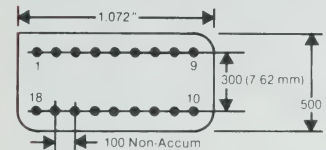
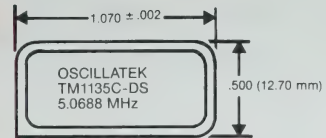

HERMETICALLY SEALED
DIP PACKAGE


FEATURES

- Pin for pin compatible with most of the standard dual baud rate generators available in the market to provide a crystal controlled reference for serial communications applications.
- Very versatile — can be used as a programmable oscillator with crystal frequency in the range of 3.20MHz to 5.20MHz
- Internal crystal oscillator designated to meet your temperature/stability requirements.
- CMOS, TTL Compatibility
- Choice of 2 x 16 output frequencies, selectable manually or using software control.
- Dual feature allows to receive and transmit simultaneously.
- Resistance weld, hermetically sealed 18 Pin - Dip package, can be screened to MIL-O-55310/16, Class B, Table II.
- TM1135D has direct oscillator frequency available at Pin 1 along with divide by 4 (oscillator ÷ 4) available at Pin 10. TM1135C is similar to TM1135D except oscillator frequency is not available at Pin 1.
- TM1135E is same as TM1135D except crystal frequency is 4.9152MHz to get zero error at 19,200 baud.
- TM1135C, TM1135D, and TM1135E operate from a single 5V DC supply.

PIN FUNCTIONS

PIN NO.	CONN.	FUNCTION
1	NC Fo	No connection for TM1135C. Oscillator output for TM1135D and TM1135E
2	Vcc	Power supply; 5VDC
3	FR	Receiver output selected by Receiver Divisor select data bits.
4-7	RA, RB, TC, RD 4 5 6 7	These inputs as shown in Table 1, select the receiver output frequency FR.
8	STR	Strobing or hard wiring this Pin to high level loads the receiver data (RA, RB, RC, RD) into the receiver divisor select register
9	NC	No connection
10	Fo/4	Internal oscillator frequency divided by 4
11	GND	Ground
12	STT	Strobing or hard wiring this pin to high level, loads the transmitter data (TA, TB, TC, TD) into the transmitter-divisor select register.
13-16	TD, TC, TB, TA 13 14 15 16	These inputs as shown in Table 1, select the transmitter output frequency FR.
17	FT	This output runs at a frequency selected by the transmitter divisor select data bits.
18	NC	No connection

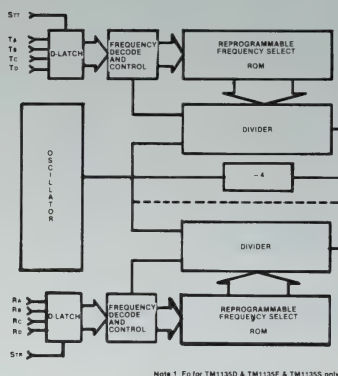


● OUTPUT OPTIONS

TABLE 1

Divisor Select DCBA	Desired Baud Rate	Desired Frequency (KHz)	TM1135C Fo = 5.0688 MHz Fo ÷ 4 = 1.2672 MHz				TM1135 E Fo = 4.9152 MHz REF. = Fo ÷ 4 = 1.2288 MHz					
			Actual Baud Rate	Actual Frequency (KHz)	Deviation	Divisor	Duty Cycle	Actual Baud Rate	Actual Frequency (KHz)	Deviation	Divisor	Duty Cycle
0000	50.00	0.80000	50.00	0.800000	0.0000%	6336	50-50	50.00	0.800000	0.0000%	6144	50-50
0001	75.00	1.20000	75.00	1.200000	0.0000%	4224	50-50	75.00	1.200000	0.0000%	4096	50-50
0010	110.00	1.76000	110.00	1.760000	0.0000%	2880	50-50	109.93	1.758983	0.0100%	2793	40-60
0011	134.50	2.15200	134.52	2.152357	0.0166%	2355	50-50	134.50	2.152000	0.0000%	2284	50-50
0100	150.00	2.40000	150.00	2.400000	0.0000%	2112	50-50	150.00	2.400000	0.0000%	2048	50-50
0101	300.00	4.80000	300.00	4.800000	0.0000%	1056	50-50	300.00	4.800000	0.0000%	1024	50-50
0110	600.00	9.60000	600.00	9.600000	0.0000%	528	50-50	600.00	9.600000	0.0000%	512	50-50
0111	1200.00	19.20000	1200.00	19.200000	0.0000%	264	50-50	1200.00	19.200000	0.0000%	256	50-50
1000	1800.00	28.80000	1800.00	28.800000	0.0000%	176	50-50	1796.49	28.743859	0.1949%	171	40-60
1001	2000.00	32.00000	2005.06	32.081013	0.2532%	158	50-50	1994.81	31.916883	0.2597%	154	50-50
1010	2400.00	38.40000	2400.00	38.400000	0.0000%	132	50-50	2400.00	38.400000	0.0000%	128	50-50
1011	3600.00	57.60000	3600.00	57.600000	0.0000%	88	50-50	3614.11	57.825882	0.3921%	85	40-60
1100	4800.00	76.80000	4800.00	76.800000	0.0000%	66	50-50	4800.00	76.800000	0.0000%	64	50-50
1101	7200.00	115.20000	7200.00	115.200000	0.0000%	44	50-50	7144.19	114.306976	0.7751%	43	40-60
1110	9600.00	153.60000	9600.00	153.600000	0.0000%	33	48-52	9600.00	153.600000	0.0000%	32	50-50
1111	19200.00	307.20000	19800.00	316.800000	3.1250%	16	50-50	19200.00	307.200000	0.0000%	16	50-50

● BLOCK DIAGRAM



Note 1: F0 for TM1135D & TM1135E & TM1135S only

■ ENVIRONMENTAL

Per MIL-0-55310/16 (Typical)
For special requirements consult factory

● ORDERING METHOD

MODEL	TEMPERATURE STABILITY	TEMPERATURE RANGE	FREQUENCY RANGE
TM1135 C	B = ± .0025%	R = 0°C to +50°C	TM1135 C = 5.0688 MHz only
TM1135 D	C = ± .005%	S = 0°C to +70°C	TM1135 D = 5.0688 MHz only
TM1135 E	D = ± .01%	X = -20°C to +70°C	TM1135 E = 4.9152 MHz only
TM1135 S	E = ± .05%	Y = -30°C to +85°C	TM1135 S = specify from 3.2 MHz to 5.20 MHz to use as programmable oscillator
	F = ± .1%	Z = -55°C to +125°C	

NOTE:

B for 0°C to 50°C only

● ELECTRICAL CHARACTERISTICS (TYPICAL)

■ MAXIMUM RATINGS

Operating Temperature Range 0°C to 70°C
Storage Temperature Range -55°C to 125°C
+ VE Voltage on any pin w.r.t. ground + 8v
- VE Voltage on any pin w.r.t. ground - 3v

■ STANDARD CONDITIONS (UNLESS OTHERWISE NOTED)

Temperature = 0°C to 70°C
Vcc = +5V ± 5%

■ D C CHARACTERISTICS

CHARACTERISTICS	MIN	TYP	MAX	UNIT	CONDITIONS
Input Voltage Low level = (VIL) High level = (VIH)	— 2.0	— —	0.8 —	V V	
Output Voltage Low level = (VOL) High level = (VOH)	— 3.5	— —	0.4 —	V V	IOL = 1.6mA, for Fo/4 IOM = 100μA, for FR, FT
Input Current Low level (IIL)	—	—	-0.1	mA	VIN = GND RA, RD, TA, TD
Input Capacitance (All inputs)	—	5	10	pF	VIN = GND
Supply Current = (ICC)	—	—	50	mA	

■ A C CHARACTERISTICS

CHARACTERISTICS	MIN	TYP	MAX	UNIT	CONDITIONS
Clock Frequency = (Fo)	.01	—	5.2	MHz	
Strobe Pulse Width	150	—	DC	nS	
Input Set Up Time	200	—	—	nS	
Input Hold Time	50	—	—	nS	
Strobe to New Freq. Delay	—	—	3.5	μS	at Fo = 5 MHz

EXAMPLE

TM1135 C	—	D	S	5.0688 MHz	Write "SCREENED" if screening to MIL-0-55310/16, Class B, Table II is required.
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Oscillatek Crystal Oscillators
SPECIFYING AND RFQ FORM

PLEASE SPECIFY CRITICAL PARAMETERS ONLY

Name: _____
Company: _____
Address: _____
City: _____ State: _____

Title: _____
Phone: _____ Ext.: _____
Dept.: _____ Mail Stop: _____
Zip: _____ Date: _____

QUANTITY NEEDED:

Immediate: _____
Future: _____

Delivery Required: _____
Approximate Due Date: _____

CUSTOMER SPEC DRAWING NO. _____

DEVICE TYPE AND APPLICATION: _____

FREQUENCY & STABILITY

Frequency _____
Frequency Stability Versus
Temperature _____
Time _____
Supply Variation _____
Load Variation _____
Acceleration _____

Operating Temp. Range _____ °C to _____ °C

Freq. Tolerance @ 25°C _____

Freq. Trim Range _____ ☐ Mech. ☐ Elect.

POWER SUPPLY:

Osc. _____ ± _____ @ _____ ma

Oven _____ ± _____ @ _____ ma

Warm Up _____

ADDITIONAL SPECS OR COMMENTS: _____

OUTPUT WAVEFORM:

Sine ☐

Output Level _____

Harmonics _____ Subs. _____

Spurious _____

Load _____

VSWR _____

Square ☐

☐ TTL ☐ CMOS ☐ ECL ☐ HCMOS

Rise Time _____ Fall Time _____

Measured From _____ to _____

Duty Cycle _____ Measured @ _____

Logic "0" _____ Logic "1" _____

Load _____

Logic Supply _____

ENVIRONMENTAL:

Storage/Non-Op. Temp. _____

Shock _____

Vibration _____

Acceleration _____

Humidity _____

Seal _____

Other _____

MECHANICAL:

Size _____

Mounting _____

Other _____

SPECIAL NOTES: _____

VCXO CHARACTERISTICS (FREQ. CONTROL):

Frequency Deviation _____

Control Voltage _____

Linearity _____

Transfer Function _____

Modulation Rate _____

Input Impedance _____

Other _____

I/O Connectors _____

Finish _____

ORDER INFORMATION

Oscillatek offers designers a wide selection of high quality crystal controlled thick film oscillators, temperature compensated crystal oscillators and a variety of custom designed oscillators for unique applications.

Oscillatek is a service oriented organization where sales and engineering work very closely with the customer to achieve optimum designs which give the best performance with reasonable cost. Engineering also helps our customers by providing samples in a timely manner. Our philosophy is to solve customer problems by establishing open communications with our customers. Engineering is constantly involved in research and development to prepare Oscillatek for tomorrow's oscillator requirements.

Our Quality Control department is responsible for maintenance of quality by constantly monitoring the following:

1. Administration of a MIL-I-45208 inspection system on a continuous basis.
2. Calibration of test and production equipment in accordance with MIL-STD-45662.
3. Incoming inspection of all raw materials and components.
4. In-process inspection at critical points.
5. Final inspection for acceptance.

We are very responsive to all inquiries and requests for information from our customers. Besides our standard oscillators described in the following pages, we also provide service for special custom applications to fit your needs precisely. Call us or mail a request for product information; it may be one of the most important steps you have ever taken to fulfill your oscillator needs.

TECHNICAL ASSISTANCE

Since Oscillatek is represented across the U.S. and throughout the world by trained field engineers and representatives, any technical assistance you may need is just a phone call and a few minutes away. Whether you need additional technical information, assistance in selecting a crystal oscillator or just want to know if your design is taking advantage of the very latest technology — contact the Oscillatek factory or the representative nearest you. You'll receive the information you need, without any obligation.

WARRANTY

Products manufactured by Oscillatek are warranted against defective material and workmanship for one year from date of shipment. Oscillatek's obligation for any defect shall be limited to repair or replacement of defective parts. Oscillatek assumes no liability if defects result from improper use, operation outside rated capacities, repairs not made by us, or misapplication of the equipment.

No other warranty is expressed or implied, and Oscillatek neither makes nor authorizes any other person to make any other warranty concerning its products. Oscillatek is not liable for consequential damages.

Warranty returns must first be authorized by Quality Assurance and are to be returned prepaid.

ORDERING INFORMATION

Always order by model number or part number. If modification or special testing to meet specific requirements is needed, contact our sales department.

Your order may be placed through your local representative or directly to our factory:

**620 N. Lindenwood Drive
Olathe, Kansas 66062
U.S.A.**

**Phone: 913-829-1777
Telex: 437045
Fax: 913-829-3505**

Unless shipping instructions accompany the order, we shall use our own judgement as to the best method of shipment. The price of our products includes packing but does not include shipping costs.

NOTE: Catalog specifications are subject to change without notice.

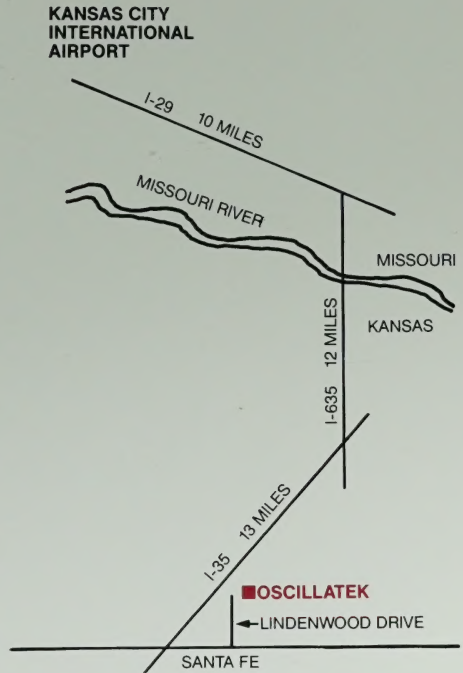
CRYSTAL OSCILLATORS

LOCATION

OSCILLATEK is located in Johnson County, Kansas in the city of Olathe (O LAY THUH), a suburb of Greater Kansas City.

From Kansas City International Airport (MCI) take I-29 south to I-635 south to I-35 south. Take the first Olathe exit (approximately 35 miles south of the airport) and go left 4 blocks on Santa Fe to Lindenwood Drive, then left to the OSCILLATEK plant, 620 N. Lindenwood Drive.

Shuttle bus service is available hourly from the airport to most major hotels in Johnson County.



OSCILLATEK

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